No. 9600140

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Montana Agricultural Experiment Station

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED, PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR PRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR KING IT FOR ANY OF THE ABOVE PURPOSES, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. IN ED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CE D AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE R TAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

Barley

'Chinook'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of Washington, D.C. this twenty-eighth day of November in the year of our Lord one thousand nine hundred and ninety-seven.*

Attest:

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

FORM APPROVED: OMB 0581-0055, Expires 1/31/91

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) *(as it is to appear on the Certificate)*
Dr. Tom Blake, Developer for
Montana Agricultural Experiment Station

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NO.
PI591823

3. VARIETY NAME
Chinook

4. ADDRESS *(street and no. or R.F.D. no., city, state, and ZIP)*
Linfield Hall
Montana State University
Bozeman, MT 59717

5. PHONE *(include area code)*
406 994 3681

FOR OFFICIAL USE ONLY

PVPO NUMBER
9600140

FILING
Date 11-4-96
Time ☐ A.M. ☐ P.M.

FEES RECEIVED
Filing and Examination Fee: $ 2450
Date 2-14-96
Certificate Fee: $ 300.00
Date 11/19/97

6. GENUS AND SPECIES NAME
Hordeum vulgare

7. FAMILY NAME *(Botanical)*
Poaceae

8. CROP KIND NAME *(Common Name)*
Barley

9. DATE OF DETERMINATION

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*
Experiment Station

11. IF INCORPORATED, GIVE STATE OF INCORPORATION

12. DATE OF INCORPORATION

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS
Dr. Tom Blake, Professor and Barley Breeder
Department of Plant, Soil and Environmental Sciences
Montana State University

AAA (per phone call) 22 Mar 1996

PHONE *(include area code)*: (406) 994-5055

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED *(Follow INSTRUCTIONS on reverse)*

a. [X] Exhibit A, Origin and Breeding History of the Variety
b. [X] Exhibit B, Novelty Statement.
c. [X] Exhibit C, Objective Description of Variety.
d. [X] Exhibit D, Additional Description of Variety. Not found AAA 21 Oct 1997
e. [X] Exhibit E, Statement of the Basis of Applicant's Ownership.
f. [X] Seed Sample (2,500 viable untreated seeds). Date Seed Sample mailed to Plant Variety Protection Office _____
g. [X] Filing and Examination Fee. ($2,325) made payable to "Treasurer of the United States."

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See section 83(a) of the Plant Variety Protection Act.)*
[X] YES *(If "YES," answer items 16 and 17 below)* ☐ NO *(If "NO," skip to item 18 below)*

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
[X] YES ☐ NO

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
[X] FOUNDATION [X] REGISTERED [X] CERTIFIED

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
☐ YES *(If "YES," through* ☐ Plant Variety Protection Act ☐ Patent Act Give date _____ *)*
[X] NO

19. HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?
☐ YES (If "YES," give names of countries and dates)
[X] NO Foundation and Registered seed will be released to growers in the spring of 1996

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in section 41, and is entitled to protection under the provisions of section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT *(Owner(s))*	CAPACITY OR TITLE	DATE
Thomas R. Blake	Professor	2/13/96
SIGNATURE OF APPLICANT *(Owner(s))*	CAPACITY OR TITLE	DATE

PVP Application for 'Chinook' barley

14a 'Chinook' barley (*Hordeum vulgare* L.) (PI 591823) was developed by the Montana Agricultural Experiment Station and foundation seed production was initiated in the spring of 1995. Foundation and Registered seed will be available to certified seed growers in the spring of 1996. It is a selection from the cross 'Hector'/'Klages'. The initial cross was made in Bozeman, MT in 1973. A single F_{18} plant was selected from the F_9 derived MT140523 in 1989 and advanced to replicated yield trials in 1991.

Chinook is a two-rowed, white kerneled, midseason spring barley. It has midlax, midlong spikes which are seminodding before maturity and which nod at maturity, similar to 'Lewis' (CI15856). The spike has rough awns, glume awns are equal to the length of the hair-covered glume. The kernels have adhering, finely wrinkled hulls. The rachillas have long hairs.

Compared with 'Hector' (CI15514) the most widely grown feed barley in Montana, Chinook provides 9% greater grain yield, with similar kernel plumpness and test weight. Chinook flowers at the same time as Hector, is 3cm shorter at maturity than Hector, and lodges 30% less than Hector. Chinook provides 3% greater grain yield, 2% greater test weight, and flowers one day earlier than Harrington, the most widely grown malting barley variety in Montana, in replicated yield trials at eleven locations over three years (see appended table). Similar differences were observed between the parental bulk population, MT140523 and both Harrington and Hector in over 100 location/years' tests in Montana. No significant differences in agronomic performance have been observed between Chinook and MT140523 in 33 location/years' tests. Chinook, like Hector and Harrington, is susceptible to the effects of the Russian wheat aphid (*Diuraphis noxia* L.) and displays limited tolerance and no observed resistance to scald (*Rynchosporium secalis* Oud.), net blotch (*Dreschlera teres* Sacc.) and powdery mildew (*Etisyphe graminis* DC. f. sp. *hordei* Em. Marchal).

1) 'Chinook' has been in large scale testing for several years and in production for two. To this date no offtypes have been identified by myself, our foundation seed staff, or farmers. To the best of our knowledge, it is both uniform and stable.

2) MT140523 (the population derived from the F9 plant) was evaluated for agronomic performance and malting quality for several years. Its agronomic performance was nearly ideal for a variety of its class, but looking at the micromalting data it was obvious that germination heterogeneity was present in the population. I selected single plants (by that time it was the F18 generation), increased seed from each and evaluated 60 for yield and malting quality in replicated experiments grown at our research farm outside Bozeman. We identified malting quality heterogeneity and identified one line (line 21) which showed agronomic performance essentially identical to MT140523, but which showed nearly ideal malting quality. This was advanced, and our observations confirmed through our statewide replicated yield trial testing program, which I manage. The criteria used for selecting this line over its siblings were yield and malting quality.

Inserted 21 Oct 1997
BAA per email

14b. PVP Application for 'Chinook' Barley

Statement of Novelty

'Chinook' barley is a member of the 2-rowed germplasm group commonly referred to as the 'Hannchen' group. It's closest relatives, Hector, Klages, Lewis and Clark, show generally similar morphological characteristics. Like 'Chinook', the varieties Klages and Clark received recommendation by the American Malting Barley Association for use as malting barley. These varieties may all be distinguished from one another based on simply inherited molecular markers. The molecular markers cited in this application are sequence-tagged-sites which are derived from cloned sequences of barley DNA. These have been mapped to specific barley chromosomes, and represent well-characterized DNA markers which are identifiable at all stages of plant development. While we have developed over 300 markers of this type and have characterized these genotypes for several markers, only two are required to distinguish 'Chinook' from all other 2-rowed varieties grown in the region. With addition of a third, all lines (with the exception of the sister lines, Clark and Lewis) may be distinguished from each other. The technology utilized to develop these markers has been fully described by our laboratory (Tragoonrung S, Kanazin V, Hayes PM, Blake TK. 1992. Sequence-tagged-site facilitated PCR for barley genome analysis. Theor. Appl. Genet. 84:1002-1008; Chee PW, Pederson L, Tragoonrung S, Kanazin V, Blake T. 1993. Development of PCR for Barley Varietal Identification. J. Am. Soc. Brew. Chemists 51(3):93-96.). The primer sets required to distinguish among these specific varieties were publicly disclosed through the public access GrainGenes database (http://wheat.pw.usda.gov/graingenes.html, in Kanazin V, Ananiev A, Blake, T. 1993. Variability among members of the *Hor*-2 multigene family. Genome 36:397-403, and in Kleinhofs A, Kilian A, Saghai-Maroof MA, Biyashev RM, Hayes P, Chen FQ, Lapitan N, Fenwick A, Blake TK, Kanazin V, Ananiev A, Dahleen L, Kudrna D, Bollinger J, Knapp SJ, Liu B, Sorrells M, Heun M, Franckowiak JD, Hoffman D, Skadsen R, Steffenson BJ. 1993. A molecular, isozyme and orphological map of the barley genome. Theor. Appl. Genet. 86:705-712.).

Barley Varieties[1] and their allelic states

Primer Set	Ha	Ga	Ba	Cl	Le	He	Kl	Ch
ABG377 HaeIII	a	a	a	b	b	b	a	a
KV1,9 (Hor-2)	b	a	c	a	a	a	d	a
KV12-24 (His3A)	b	c	b	a	a	c	b	a

[1] Ha: Harrington; Ga: Gallatin; Ba: Baronesse; Cl: Clark; Le: Lewis; He: Hector; Kl: Klages; Ch:Chinook

Annotated photos of products of PCR amplification using the primers listed are attached. The two-letter abbreviations indicate varietal names as above. MW indicates HaeIII restricted PhiX 174 DNA used as a molecular weight marker set. All separations were done in 6% polyacrylamide gels using 1xTBE as buffer and Ethidium bromide staining.

Figure 1. Allelic States at the *His 3A* locus on barley chromosome 1 (wheat homoeologous group 7). Lanes from left: Molecular Weight Standards (PhiX 174 DNA restricted with *Hae III* restriction endonuclease) are labeled MW. *His 3A* primers (listed as KV12, KV24 in Kanazin et al., *in press*; Kleinhofs et al., 1993) directed amplification of the intron in the *His 3A* gene from DNA from the varieties Harrington (Ha), Gallatin (Ga), Baronesse (Ba), Clark (Cl), Lewis (Le), Hector (He), Klages (Kl), and Chinook (Ch). Note the common patterns among Chinook, Lewis and Clark.

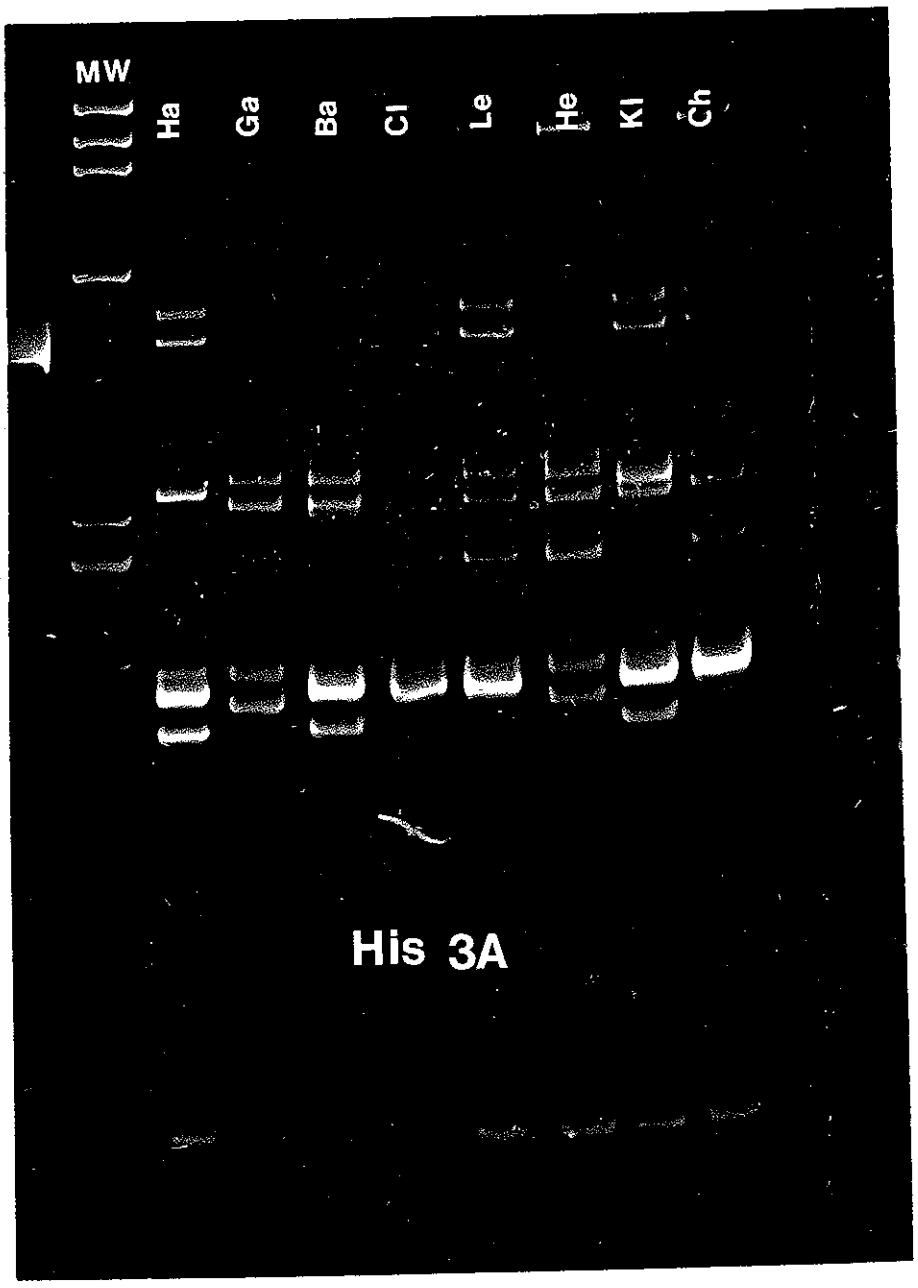


Figure 2. Allelic States at the *ABG 377* locus on barley chromosome 3 (wheat homoeologous group 3) following restriction with the restriction endonuclease *Hae III*. Lanes from left: *ABG 377* primers directed amplification of the ABG377 from DNA from the varieties Chinook (Ch), Klages (Kl), Hector (He), Lewis (Le), Clark (Cl), Baronesse (Ba), Gallatin (Ga) and Harrington (Ha). Note the common patterns among Hector, Lewis and Clark, and their distinctive differences when contrasted with Chinook. This difference is due to the presence of a *Hae III* restriction site in the allele derived from Hector which has been transmitted to both Lewis and Clark. Chinook received the allele derived from Klages, which lacks this restriction site.

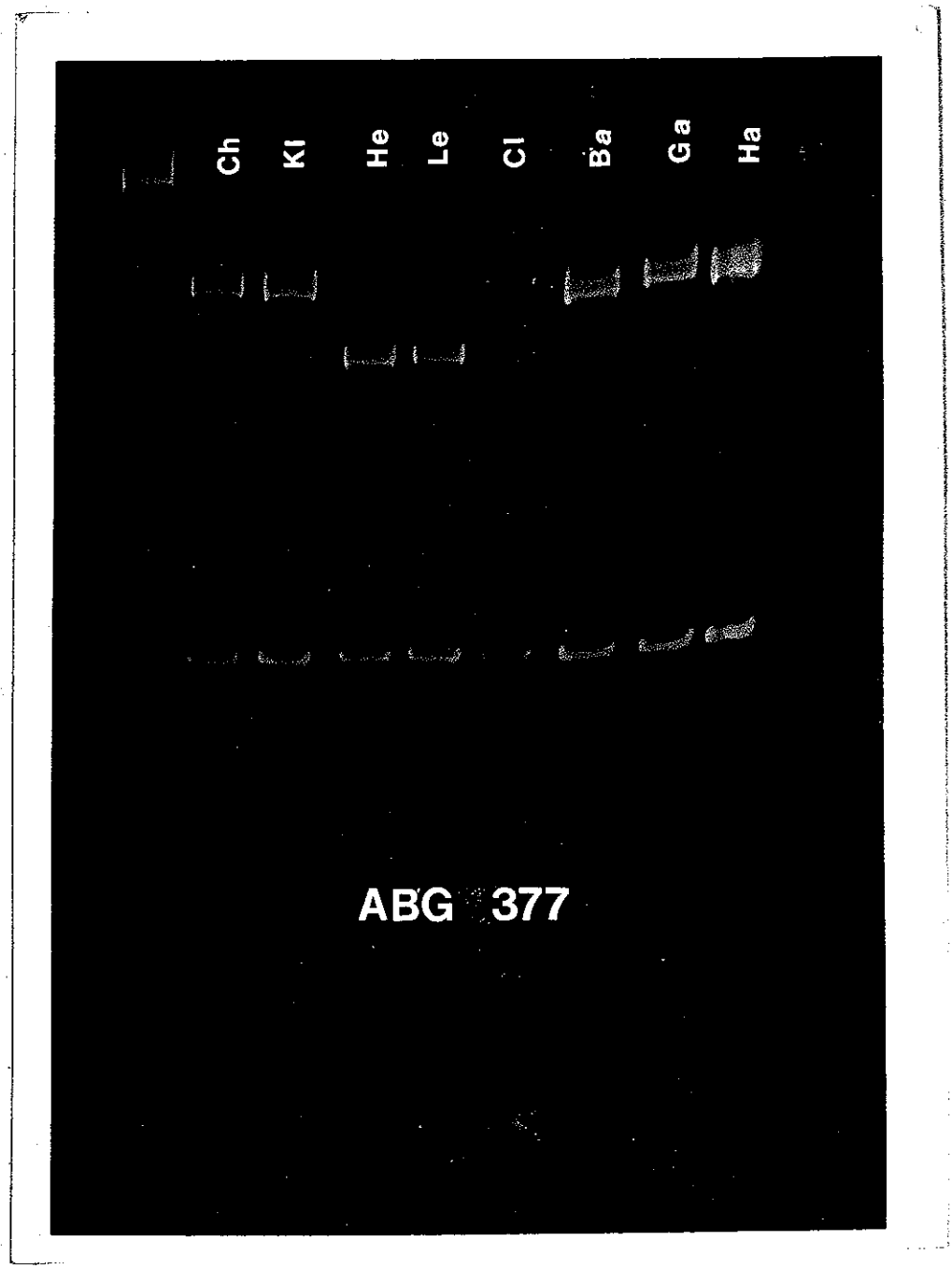
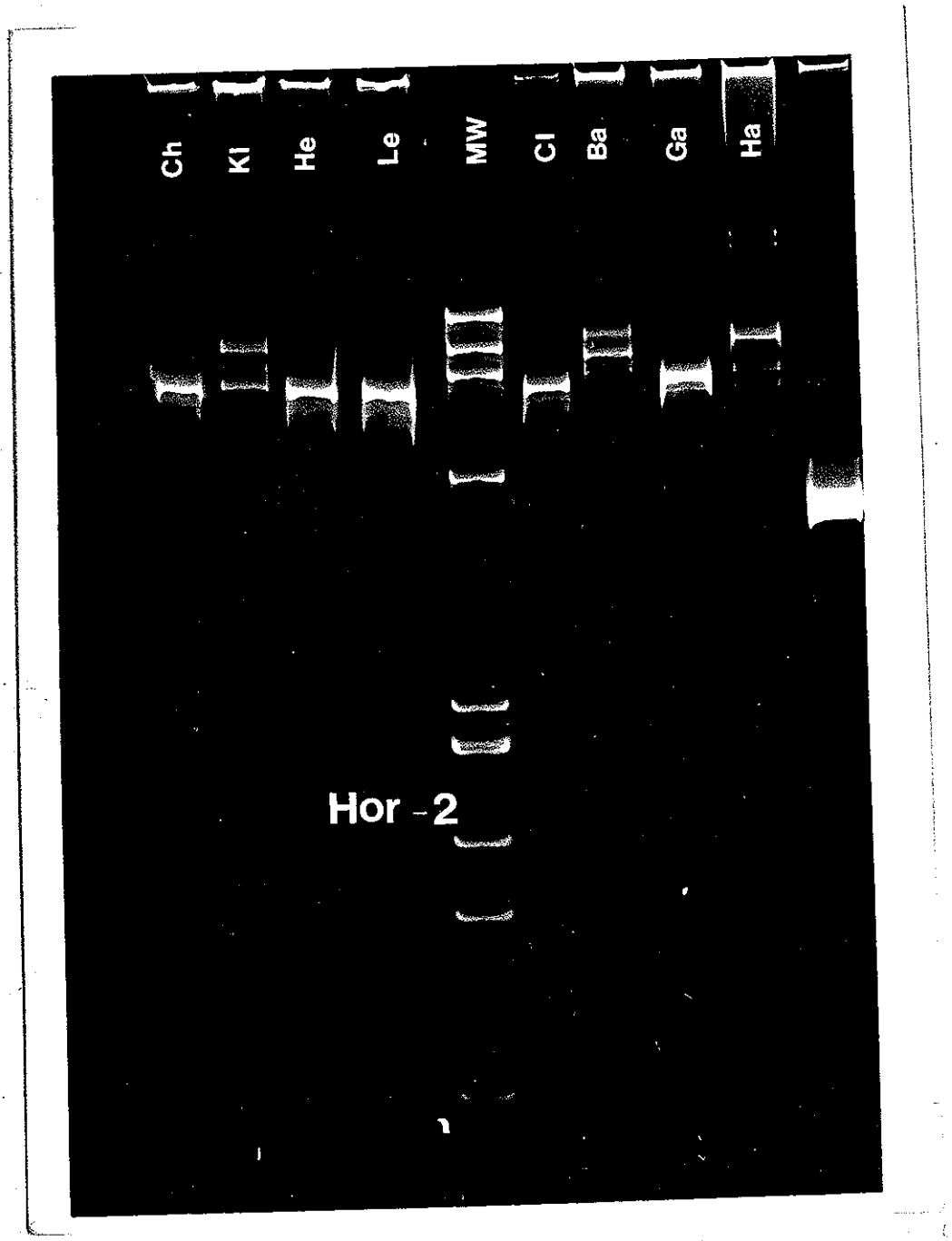


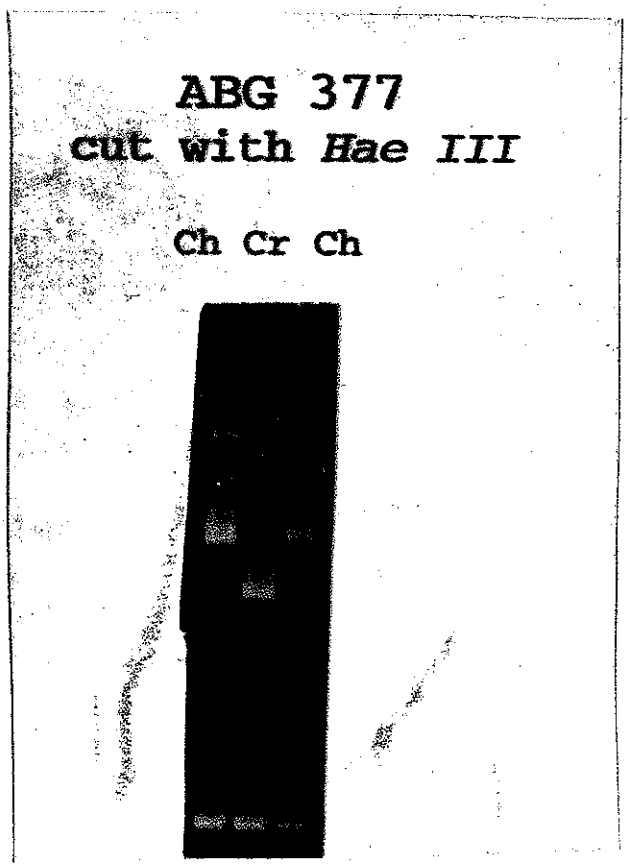
Figure 3. Allelic States at the *Hor-2* locus on barley chromosome 5 (wheat homoeologous group 1) . Lanes from left: *ABG 377* primers directed amplification of the Hor-2 locus from DNA from the varieties Chinook (Ch), Klages (Kl), Hector (He), Lewis (Le), Phi X 174 (*Hae III* digested) molecular weight markers, Clark (Cl), Baronesse (Ba), Gallatin (Ga) and Harrington (Ha). Note the common patterns among Chinook, Hector, Lewis and Clark, and their distinctive differences when contrasted with Klages. This difference is due to the transmission of the allele derived from Hector which has been transmitted to Chinook, Lewis and Clark. None of these lines received the allele derived from Klages.



Revised Exhibit B
Chinook is likely to be among the most stable and uniform of 2-rowed barley varieties grown in the United States. As it was advanced from a single F18 plant derived from the cross 'Hector' x 'Klages', it is unlikely to derive from a plant heterozygous at a significant number of loci. Neither phenotypic nor molecular variants have as of yet been observed in this variety.

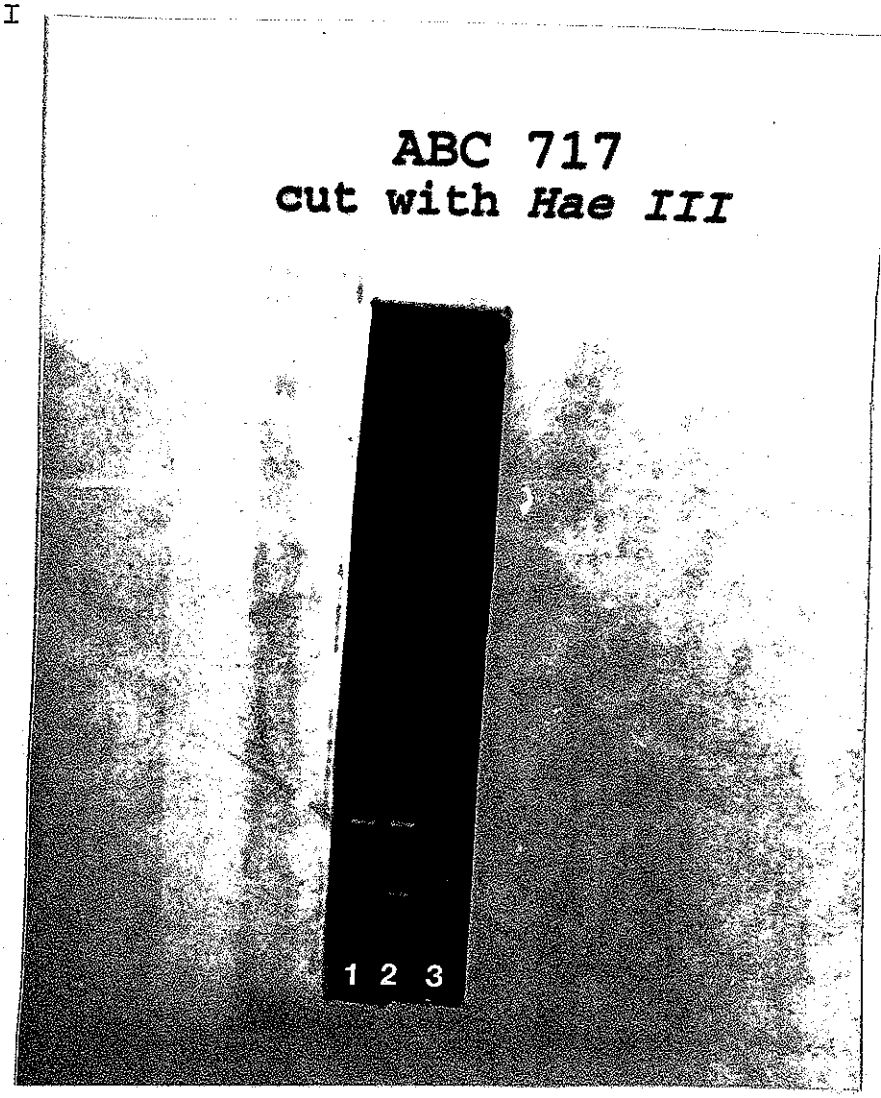
The two most similar varieties to 'Chinook' are the varieties 'Lewis' and Clark'. The differences with respect to Lewis and Clark were detailed in the previously submitted Exhibit B. The differences between Crystal and Chinook are as follows:

Fig. 1
ABG377 cut with HaeIII



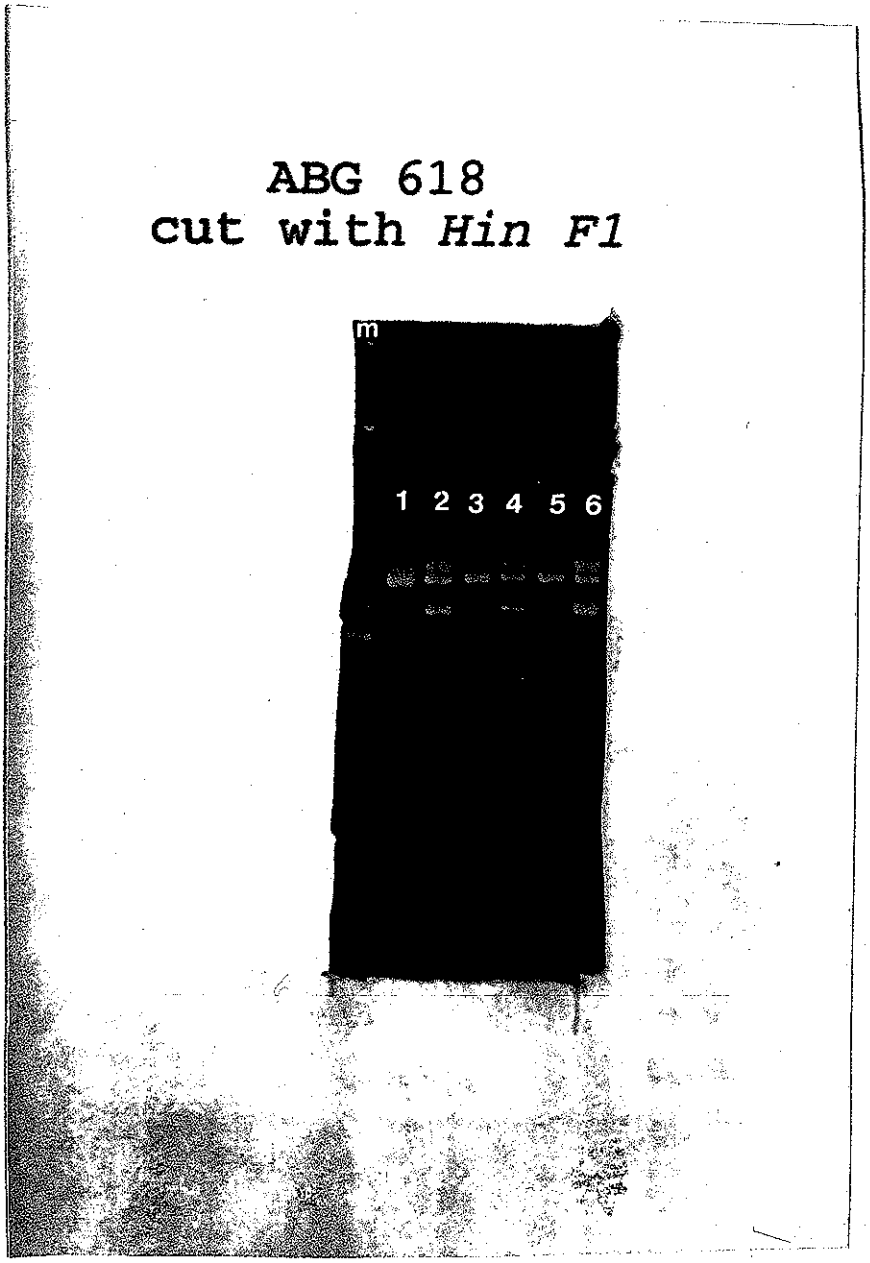
This marker lies on barley chromosome 3, and the *Hae III* restriction site polymorphism is commonly found within both 2-rowed and 6-rowed barley germplasm groups. This site clearly differentiates Chinook (Ch labeled lanes) from Crystal (Cr labeled lane).

Fig. 3 ABC717 cut with HaeIII



This marker lies on barley chromosome 5H. The 'a' allele found in Chinook (lanes 1 and 3) is also found in many related varieties. The 'b' allele found in Crystal appears to be a relatively rare allele in the 2-rowed 'Hannchen' germplasm pool, although it is common among 6-rowed malting barley varieties grown in the Midwest.

Fig. 2
ABG618 cut with HinF1



ABG618 lies on barley chromosome 4. The *Hin F1* polymorphism shown is found commonly in both 2-rowed and 6-rowed germplasm pools. The phenotype produced from Chinook amplification products (lanes 1,3,5) is easily differentiated from that produced by Crystal amplification products (lanes 2,4,6). Molecular weight markers are shown in the lane labeled 'm'. Independently extracted DNA samples were used for each lane, demonstrating the uniformity of results commonly observed with this primer set.

9600140

Summary:
Our lab has produced over 300 primer sets derived from sequenced barley and wheat clones. Many of these produce highly informative products. Three of these primer sets are featured above. These demonstrate the uniqueness of 'Chinook' relative to the previously released variety 'Crystal'. 'Chinook' has been tested in replicated yield trials at multiple sites throughout Montana for over 5 growing seasons, and has been found to be morphologically uniform. We recently tested 85 Chinook seeds sampled from a bag of registered seed and found them to be uniform for the molecular marker ABG377. On these empirical bases and on the theoretical basis that 'Chinook' derived from a single F18 plant, we believe 'Chinook' to be uniform. 'Chinook', unlike its most similar released variety 'Lewis' has been recommended as a malting barley by the American Malting Barley Association. We believe that the best way to ensure the maintenance of varietal purity for 'Chinook' is to receive varietal protection.

FORM APPROVED: OMB NO. 40-R3822

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK AND SEED DIVISION
BELTSVILLE, MARYLAND 20705

EXHIBIT C (Barley)

9600140

OBJECTIVE DESCRIPTION OF VARIETY
BARLEY (*HORDEUM VULGARE*)

INSTRUCTIONS: See Reverse.

NAME OF APPLICANT(S)
Montana Agricultural Experiment Station

ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code)
Linfield Hall
Montana State University, Bozeman, MT 59717

FOR OFFICIAL USE ONLY
PVPO NUMBER

VARIETY NAME OR TEMPORARY DESIGNATION: Chinook

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (i.e. [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

1. GROWTH HABIT:

[1] 1 = SPRING 2 = FACULTATIVE WINTER 3 = WINTER [3] Early Growth: 1 = PROSTRATE 2 = SEMIPROSTRATE 3 = ERECT

2. MATURITY (50% Flowering):

[2] 1 = EARLY (California Mariout) 2 = MIDSEASON (Betzes) 3 = LATE (Frontier)

[10] No. of days *Earlier* than ..... [1]
[-1] No. of days *Later* than ..... [5]
1 = BETZES 2 = CALIFORNIA MARIOUT 3 = CONQUEST 4 = DICKSON 5 = PIROLINE 6 = PRIMUS 7 = UNITAN

3. PLANT HEIGHT (From soil level to top of head):

[3] 1 = SEMIDWARF 2 = SHORT (California Mariout) 3 = MEDIUM TALL (Betzes) 4 = TALL (Conquest)

[0][3] Cm. *Shorter* than ..... [1]
~~[0][0] Cm. *Taller* than ..... [1]~~
1 = BETZES 2 = CALIFORNIA MARIOUT 3 = CONQUEST 4 = DICKSON 5 = PIROLINE 6 = PRIMUS 7 = UNITAN

Disregard, Mr letter AAA 19 June 1997

4. STEM:

[1] Exertion *(Flag to spike at maturity)*: 1 = 0 - 3 cm. 2 = 3 - 10 cm. 3 = 10 - 15 cm.
[1] Anthocyanin: 1 = ABSENT 2 = PRESENT

[0][.5] NO. OF NODES (Originating from node above ground)

[1] Collar Shape: 1 = CLOSED 2 = V-SHAPED 3 = OPEN 4 = MODIFIED CLOSED OR OPEN
[1] Shape of Neck: 1 = STRAIGHT 2 = SNAKY 3 = OTHER (Specify)

5. LEAF:

[1] Basal leaf sheath *(seedling)*: 1 = GLABROUS 2 = PUBESCENT
[2] Position of flag leaf *(at boot stage)*: 1 = DROOPING 2 = UPRIGHT
[2] Waxiness: 1 = ABSENT (Glossy) 2 = SLIGHTLY WAXY 3 = WAXY
[1][4] MM. WIDTH (First leaf below flag leaf)
[2][2] CM. LENGTH (First leaf below flag leaf)
[1] Anthocyanin in leaf sheath: 1 = ABSENT 2 = PRESENT

6. HEAD:

[1] Type: 1 = TWO-ROWED 2 = SIX-ROWED
[1] Density: 1 = LAX 2 = ERECT (Not dense) 3 = ERECT (Dense)
[2] Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE 4 = OTHER (Specify)
[2] Waxiness: 1 = ABSENT (Glossy) 2 = SLIGHTLY WAXY 3 = WAXY
[1] Lateral Kernels Overlap: 1 = NONE 2 = AT TIP 3 = 1/4 - 1/2 OF HEAD
[2] Rachis *(Hair on edge)*: 1 = LACKING 2 = FEW 3 = COVERED

7. GLUME:

[3] Length: 1 = 1/3 OF LEMMA 2 = 1/2 OF LEMMA 3 = MORE THAN 1/2 OF LEMMA
[3] Hairs: 1 = NONE 2 = SHORT 3 = LONG
[4] Hair covering: 1 = NONE 2 = RESTRICTED TO MIDDLE 3 = CONFINED TO BAND 4 = COMPLETELY COVERED
[3] Awns: 1 = LESS THAN EQUAL TO LENGTH OF GLUMES 2 = EQUAL TO LENGTH OF GLUMES 3 = MORE THAN EQUAL TO LENGTH OF GLUMES
[3] Awn Surface: 1 = SMOOTH 2 = SEMISMOOTH 3 = ROUGH

8. LEMMA:

[5] Awn: 1 = AWNLESS 2 = AWNLETS ON CENTRAL ROWS, AWNLESS ON LATERAL ROWS
3 = SHORT ON CENTRAL ROWS, AWNLETS ON LATERAL ROWS 4 = SHORT (less than equal to length of spike)
5 = LONG (longer than spike) 6 = HOODED

[4] Awn Surface: 1 = AWNLESS 2 = SMOOTH 3 = SEMISMOOTH 4 = ROUGH

[2] Teeth: 1 = ABSENT 2 = FEW 3 = NUMEROUS

[1] Hair: 1 = ABSENT 2 = PRESENT

[2] Shape of base: 1 = DEPRESSION 2 = SLIGHT CREASE 3 = TRANSVERSE CREASE

[2] Rachilla Hairs: 1 = SHORT 2 = LONG

9. STIGMA:

[1] Hairs: 1 = FEW 2 = MANY

10. SEED:

[2] Type: 1 = NAKED 2 = COVERED

[2] Hairs on Ventral Furrow: 1 = ABSENT 2 = PRESENT

[4] Length: 1 = SHORT (8.0 mm.) 2 = SHORT TO MIDLONG (7.5 - 9.0 mm.) 3 = MIDLONG (8.5 - 9.5 mm.)
4 = MIDLONG TO LONG (9.0 - 10.5 mm.) 5 = LONG (10.0 mm.)

[2] Wrinkling of hull: 1 = NAKED 2 = SLIGHTLY WRINKLED 3 = SEMIWRINKLED 4 = WRINKLED

[1] Aleurone Color: 1 = COLORLESS (White or Yellow) 2 = BLUE

[0][2] PERCENT ABORTIVE

[5][0] GMS. PER 1000 SEEDS

11. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] SEPTORIA	[1] NET BLOTCH	[1] SPOT BLOTCH	[0] POWDERY MILDEW
[1] LOOSE SMUT	[0] BACTERIAL BLIGHT	[1] COVERED SMUT	[0] FALSE LOOSE SMUT
[0] STEM RUST	[0] LEAF RUST	[0] SCAB	[1] SCALD
[0] AY	[0] BSMV	[1] BYDV	[ ] OTHER (Specify)

12. INSECT: (0 = Not tested, 1 = Susceptible, 2 = Resistant)

[0] GREEN BUG	[0] ENGLISH GRAIN APHID	[0] CHINCH BUG	[0] ARMYWORM
[0] GRASS HOPPERS	[0] CEREAL LEAF BETTLE	[ ] OTHER (Specify)	

HESSIAN FLY RACES: [0] GP [0] A [0] B [0] C [0] D [0] E [0] F [0] G

13. CHEMICAL (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] DDT [ ] OTHER (Specify)

14. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	Lewis	Seed size	Lewis
Leaf size	Lewis	Coleoptile elongation	Lewis
Leaf color	Lewis	Seedling pigmentation	Lewis
Leaf carriage	Lewis		

REFERENCES: The following publications may be used as a reference aid for the standardization of character descriptions and terms used in this form:

1. Wiebe, G. A., and D. A. Reid, 1961, Classification of Barley Varieties Grown in the United States and Canada in 1958, Technical Bulletin No. 1224, U.S. Dept. of Agriculture.
2. Reid, D. A., and G. A. Wiebe, 1968, Barley: Origin, Botany, Culture, Winter Hardiness, Genetics, Utilization, Pests, Agriculture Handbook No. 338, U.S. Dept. of Agriculture. pp. 61 - 84.
3. Malting Barley Improvement Association, Milwaukee, Wisconsin, 1971, Barley Variety Dictionary.

COLOR: Nickerson's or any recognized color fan may be used to determine color of the described variety.

REPRODUCE LOCALLY. *Include form number and date on all reproductions.*

FORM APPROVED - OMB NO. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S)
Dr. Thomas K. Blake, Professor
Department of Plant, Soil and Environmental Science
Montana State University
Bozeman, MT 59717

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER
MT140523
H21140523

3. VARIETY NAME
Chinook

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*
Department of Plant, Soil And Environmental Science
Montana State University
Bozeman, MT 59717

5. TELEPHONE *(include area code)*
406 994 5055

6. FAX *(include area code)*
406 994 3933

7. PVPO NUMBER
9600140 (PI 591523)

8. Does the applicant own all rights to the variety? *Mark an "X" in appropriate block.* If no, please explain. [X] YES [ ] NO

9. Is the applicant *(individual or company)* a U.S. national or U.S. based company?
If no, give name of country _____ [X] YES [ ] NO

10. Is the applicant the original owner? [X] YES [ ] NO *If no, please answer the following:*

a. If original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. national(s)?
[X] YES [ ] NO *If no, give name of country* _____

b. If original rights to variety were owned by a company, is the original owner(s) a U.S. based company?
[ ] YES [ ] NO *If no, give name of country* _____

11. Additional explanation on ownership *(If needed, use reverse for extra space):*

I hereby assign all rights to 'Chinook' barley to the Montana Agricultural Experiment Station, 202 Linfield Hall, Montana State University, Bozeman, MT 59717-2860. The Montana Agricultural Experiment Station should, from this time forward, be considered the owner of the barley variety, 'Chinook', also known as MT140523 and H21140523.

Thomas K. Blake 4/7/97 Clyde F. Carroll

PLEASE NOTE: My Commission Expires 08/11/2000 Notary

Plant variety protection can be afforded only to owners (not licensees) who meet one of the following criteria: appeared before me 4/7/97 residing in Bozeman, Mt.

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species. Gallatin County

2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.

3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definition.

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